CLAIMS

What is claimed is:

1. A method for determining a parameter of interest of an earth formation with a logging tool having a source for irradiating said earth formation and a detector spaced apart from the source for making measurements resulting from interaction of said irradiation with said earth formation, the method comprising:

(a) defining a starting time for a processing time window at which said measurements are responsive primarily to said parameter of interest;

(b) defining an ending time for said processing time window at which said measurements are substantially uncontaminated by noise; and

(c) analyzing said measurements within said processing time window for determining the parameter of interest.

2. The method of claim 1 wherein defining said start time further comprises determining a time at which a value of said measurements has a predetermined relationship to a determined value of a parameter of interest at an ending time of a processing time window for an earlier operation of said source.

3. The method of claim 2 wherein said source comprises a pulsed neutron source.

4. The method of claim 2 wherein said measurements comprise gamma ray measurements.

5. The method of claim 3 wherein said parameter of interest further comprises a thermal neutron capture cross section of said earth formation.

6. The method of claim 5 further comprising determining a presence in said earth formation of at least one of (i) carbon, (ii) hydrogen, and, (iii) oxygen.

7. The method of claim 2 wherein said relationship is of the form

$$istr = K / \Sigma$$

where *istr* is the start time of a window, K is a constant, and Σ is a capture cross section at said ending time of said time window for said earlier pulsing of said source.

8. The method of claim 1 wherein defining said time window ending time further comprises forming a running sum of count rates starting at said starting time.

9. The method of claim 8 wherein defining said time window ending time further comprises determining a time at which a count rate has a predetermined relation to said running sum.

10. The method of claim 1 further comprising partitioning said window into a plurality of channels (time intervals) having a length depending upon said start time.

11. An apparatus for use within a borehole penetrating an earth formation for determining a parameter of interest of said earth formation, comprising:

(a) a source for irradiating said earth formation;

(b) a detector spaced apart from said source for making measurements resulting from interaction of said irradiation with said earth formation;

(c) a processor for

(i) defining a starting time for a processing time window for which said measurements are responsive primarily to said parameter of interest; and

(ii) defining an ending time for said processing time window for which said measurements are substantially uncontaminated by noise.

12. The apparatus of claim 11, wherein said processor defines said starting time determining a time at which a value of said measurements has a predetermined relation to a determined value of a parameter of interest at an ending time of a time window for an earlier operation of said source.

13. The apparatus of claim 12 wherein said processor further analyzes said measurements within said processing time window and determines said parameter of interest.

14. The apparatus of claim 12, wherein said source further comprises a pulsed neutron source.

15. The apparatus of claim 14, wherein said measurements further comprise gamma ray measurements.

16. The apparatus of claim 14, wherein said parameter of interest further comprises a thermal neutron capture cross section of said earth formation

17. The apparatus of claim 12, wherein said predetermined relation is of the form

$$istr = K / \Sigma$$

where *istr* is the start time of a window, K is a constant, and $\Sigma$is a capture cross section at said ending time of said time window for said earlier pulsing of said source.

18. The apparatus of claim 11 wherein said processor defines said ending time based on forming a running sum of count rates starting at said starting time.

19. The apparatus of claim 18, wherein processor defines said ending based on forming a running sum of count rates starting at said starting time.

20. The method of claim 19, wherein said processor defines said ending time based on determining a time at which a count rate has a predetermined relation to said running sum.

21. A system for obtaining a parameter of interest from an earth formation, comprising:

(a) a logging tool including:

(i) a source for irradiating said earth formation,

(ii) at least one detector spaced apart from said source for making measurements resulting from interaction of said irradiation with said earth formation;

(b) a processing unit for defining a starting time and an ending time for a time window of analysis of said measurements, wherein said measurements are responsive primarily to said parameter of interest at said starting time and are substantially uncontaminated by noise at said ending time.

22. The system of claim 21, wherein said processor defines said start time based on a a time at which a value of said measurements have a predetermined relation to a determined value of a parameter of interest at an ending time of a processing time window for an earlier operation of said source.

23. The system of claim 22, wherein said source further comprises a pulsed neutron source.

24. The system of claim 22, wherein said measurements further comprise gamma ray measurements.

25. The system of claim 22, wherein said parameter of interest further comprises a thermal neutron capture cross section of said earth formation.

26. The system of claim 22, wherein said predetermined relation is of the form

$$istr = K / \Sigma$$

where *istr* is the start time of a window, K is a constant, and Σ is a capture cross section at said ending time of said time window for said earlier pulsing of said source.

27. The system of claim 21, wherein said processor determines said ending time based on forming a running sum of count rates starting at said starting time.

28. The system of claim 27, wherein said processor determines said ending time based on determining a time at which a count rate has a predetermined relation to said running sum.